

NPN Darlington Transistor

PZTA28, MMBTA28

Description

This device is designed for applications requiring extremely high current gain at collector currents to 500 mA. Sourced from process 03.

Features

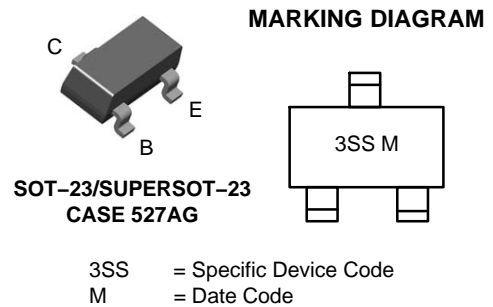
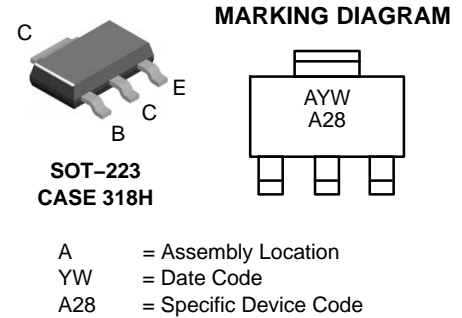
- These are Pb-Free Devices

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise noted) (Note 1, Note 2)

| Symbol | Parameter | Value | Unit |
|-----------------------------------|--|--------------|------|
| V _{CEO} | Collector–Emitter Voltage | 80 | V |
| V _{CBO} | Collector–Base Voltage | 80 | V |
| V _{EBO} | Emitter–Base Voltage | 12 | V |
| I _C | Collector Current – Continuous | 800 | mA |
| T _J , T _{STG} | Operating and Storage Junction Temperature Range | –55 to + 150 | °C |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. These ratings are based on a maximum junction temperature of 150°C.
2. These are steady-state limits. **onsemi** should be consulted on applications involving pulsed or low-duty-cycle operations.



ORDERING INFORMATION

| Device | Package | Shipping† |
|---------|---------|--------------------|
| PZTA28 | SOT-223 | 4000 / Tape & Reel |
| MMBTA28 | SOT-23 | 3000 / Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

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THEMAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

| Symbol | Parameter | Max | | Unit |
|-----------------|---|-----------------|------------------|---------------------------|
| | | PZTA28 (Note 3) | MMBTA28 (Note 4) | |
| P_D | Total Device Dissipation | 1000 | 350 | mW |
| | Derate Above 25°C | 8.0 | 2.8 | mW/ $^\circ\text{C}$ |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient | 125 | 357 | $^\circ\text{C}/\text{W}$ |

3. PCB size: FR-4, 76 mm x 114 mm x 1.57 mm (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.

4. Device mounted on FR-4 PCB 36 mm x 18 mm x 1.5 mm; mounting pad for the collector lead minimum 6cm^2 .

ELECTRICAL CHARACTERISTICS (Note 5) ($T_A = 25^\circ\text{C}$ unless otherwise noted)

| Symbol | Parameter | Test Conditions | Min | Max | Unit |
|---------------|--------------------------------------|---|-------|-----|------|
| $V_{(BR)CES}$ | Collector-Emitter Breakdown Voltage | $I_C = 100 \mu\text{A}$, $V_{BE} = 0$ | 80 | | V |
| $V_{(BR)CBO}$ | Collector-Base Breakdown Voltage | $I_C = 100 \mu\text{A}$, $I_E = 0$ | 80 | | V |
| $V_{(BR)EBO}$ | Emitter-Base Breakdown Voltage | $I_E = 10 \mu\text{A}$, $I_C = 0$ | 12 | | V |
| I_{CBO} | Collector Cut-Off Current | $V_{CB} = 60 \text{V}$, $I_E = 0$ | | 100 | nA |
| I_{CES} | Collector Cut-Off Current | $V_{CE} = 60 \text{V}$, $V_{BE} = 0$ | | 500 | nA |
| I_{EBO} | Emitter Cut-Off Current | $V_{EB} = 10 \text{V}$, $I_C = 0$ | | 100 | nA |
| h_{FE} | DC Current Gain | $I_C = 10 \text{mA}$, $V_{CE} = 5.0 \text{V}$ | 10000 | | |
| | | $I_C = 100 \text{mA}$, $V_{CE} = 5.0 \text{V}$ | 10000 | | |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $I_C = 10 \text{mA}$, $I_B = 0.01 \text{mA}$ | | 1.2 | V |
| | | $I_C = 100 \text{mA}$, $I_B = 0.1 \text{mA}$ | | 1.5 | |
| $V_{BE(on)}$ | Base-Emitter On Voltage | $I_C = 100 \text{mA}$, $V_{CE} = 5.0 \text{V}$ | | 2.0 | V |
| f_T | Current Gain – Bandwidth Product | $I_C = 15 \text{mA}$, $V_{CE} = 5.0 \text{V}$, $f = 100 \text{MHz}$ | 125 | | MHz |
| C_{obo} | Output Capacitance | $V_{CB} = 1.0 \text{V}$, $I_E = 0$, $f = 1.0 \text{MHz}$ | | 8.0 | pF |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

5. Pulse test: pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2.0\%$.

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TYPICAL PERFORMANCE CHARACTERISTICS

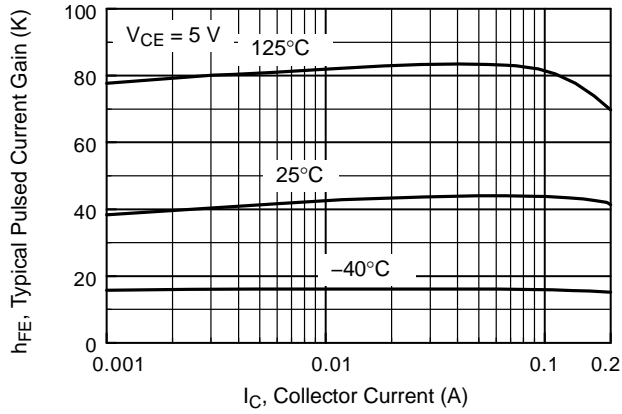


Figure 1. Typical Pulsed Current Gain vs. Collector Current

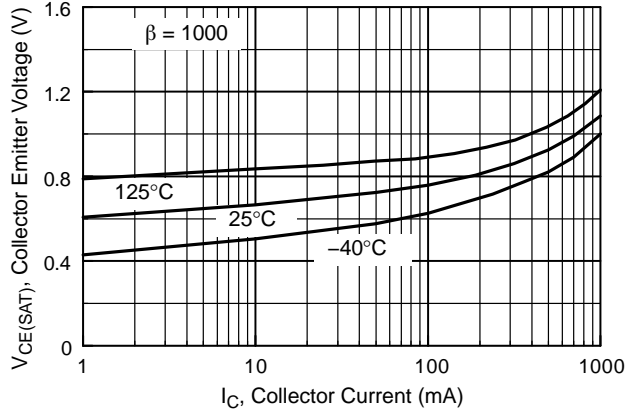


Figure 2. Collector-Emitter Saturation Voltage vs. Collector Current

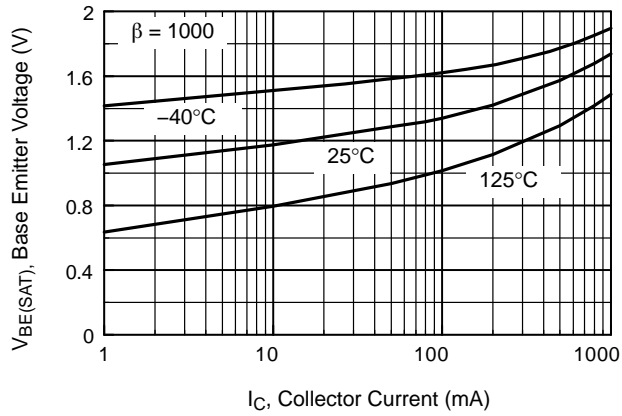


Figure 3. Base-Emitter Saturation Voltage vs. Collector Current

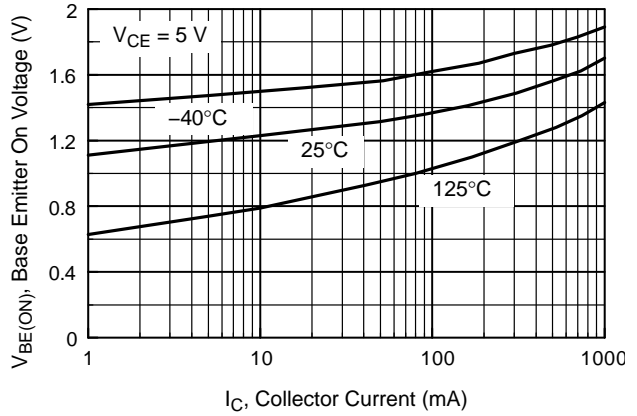


Figure 4. Base-Emitter On Voltage vs. Collector Current

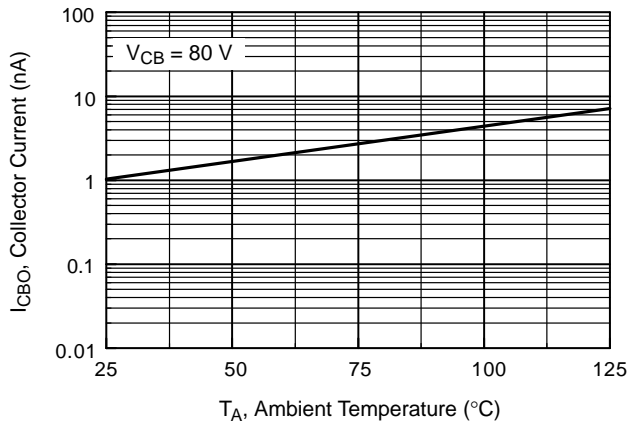


Figure 5. Collector Cut-Off Current vs. Ambient Temperature

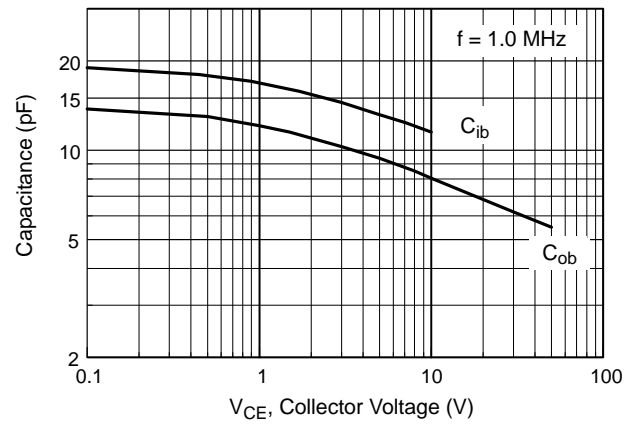


Figure 6. Input and Output Capacitance vs. Reverse Voltage

PZTA28, MMBTA28

TYPICAL PERFORMANCE CHARACTERISTICS (continued)

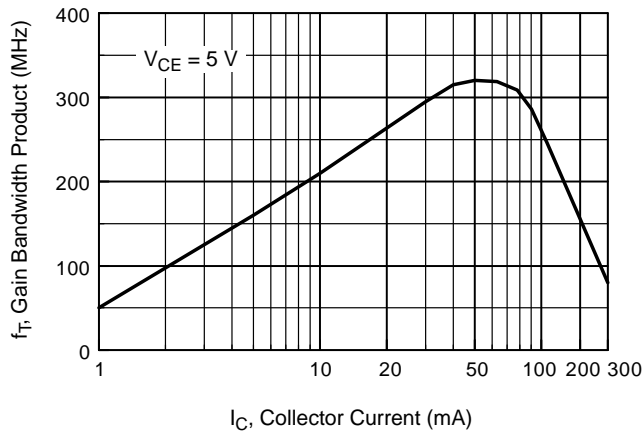


Figure 7. Gain Bandwidth Product vs. Collector Current

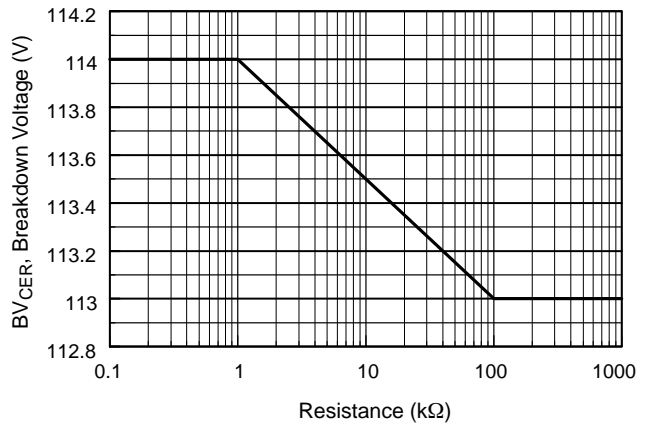


Figure 8. Collector-Emitter Breakdown Voltage with Resistance Between Emitter-Base

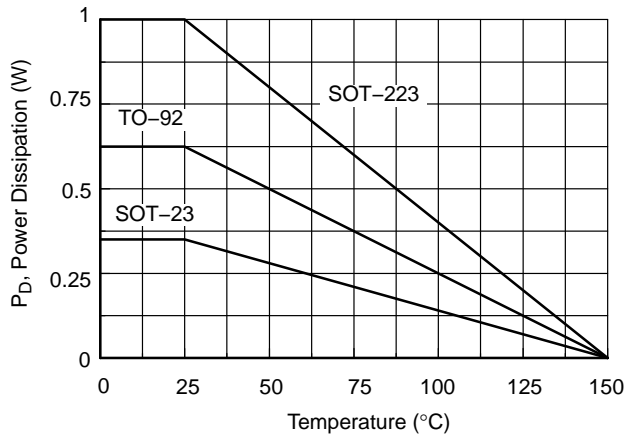


Figure 9. Power Dissipation vs. Ambient Temperature

MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

ON Semiconductor®



SOT-223
CASE 318H
ISSUE B

DATE 13 MAY 2020

SCALE 2:1



TOP VIEW

$\Phi 0.10 \text{ (M)}$ C A B

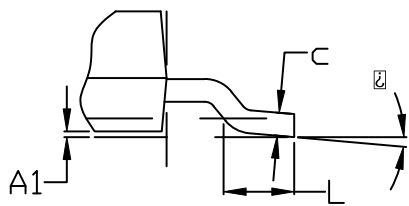
NOTE 7



SIDE VIEW



END VIEW



DETAIL A

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSIONS D & E1 ARE DETERMINED AT DATUM H. DIMENSIONS DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. SHALL NOT EXCEED 0.23mm PER SIDE.
4. LEAD DIMENSIONS b AND b1 DO NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION IS 0.08mm PER SIDE.
5. DATUMS A AND B ARE DETERMINED AT DATUM H.
6. A1 IS DEFINED AS THE VERTICAL DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT OF THE PACKAGE BODY.
7. POSITIONAL TOLERANCE APPLIES TO DIMENSIONS b AND b1.

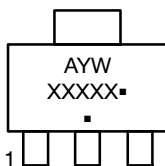
| DIM | MILLIMETERS | | |
|-----------|-------------|------|------|
| | MIN. | NDM. | MAX. |
| A | --- | --- | 1.80 |
| A1 | 0.02 | 0.06 | 0.11 |
| b | 0.60 | 0.74 | 0.88 |
| b1 | 2.90 | 3.00 | 3.10 |
| c | 0.24 | --- | 0.35 |
| D | 6.30 | 6.50 | 6.70 |
| E | 6.70 | 7.00 | 7.30 |
| E1 | 3.30 | 3.50 | 3.70 |
| e | 2.30 BSC | | |
| L | 0.25 | --- | --- |
| \square | 0° | --- | 10° |



RECOMMENDED MOUNTING FOOTPRINT

* For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERM/D.

GENERIC MARKING DIAGRAM*



- A = Assembly Location
- Y = Year
- W = Work Week
- XXXXX = Specific Device Code
- = Pb-Free Package

(Note: Microdot may be in either location)

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

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MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

ON Semiconductor®



SOT-23/SUPERSOT™ -23, 3 LEAD, 1.4x2.9
CASE 527AG
ISSUE A

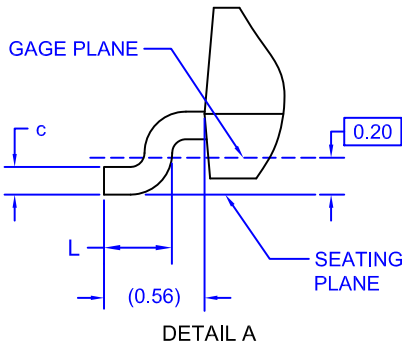
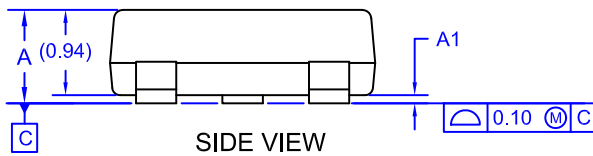
DATE 09 DEC 2019



NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. ALL DIMENSIONS ARE IN MILLIMETERS.
3. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.

| DIM | MIN. | NOM. | MAX. |
|-----|----------|-------|-------|
| A | 0.85 | 0.95 | 1.12 |
| A1 | 0.00 | 0.05 | 0.10 |
| b | 0.370 | 0.435 | 0.508 |
| c | 0.085 | 0.150 | 0.180 |
| D | 2.80 | 2.92 | 3.04 |
| E | 2.31 | 2.51 | 2.71 |
| E1 | 1.20 | 1.40 | 1.52 |
| e | 0.95 BSC | | |
| e1 | 1.90 BSC | | |
| L | 0.33 | 0.38 | 0.43 |



*FOR ADDITIONAL INFORMATION ON OUR Pb-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

GENERIC MARKING DIAGRAM*



- XXX = Specific Device Code
- M = Month Code
- = Pb-Free Package

(Note: Microdot may be in either location)

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

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